ARUP

UNIVERSITY of VIRGINIA

Outline

Arup

Sustainability Vision

Overview of SPeAR®

Sustainability Assessment Status

Relevant Examples

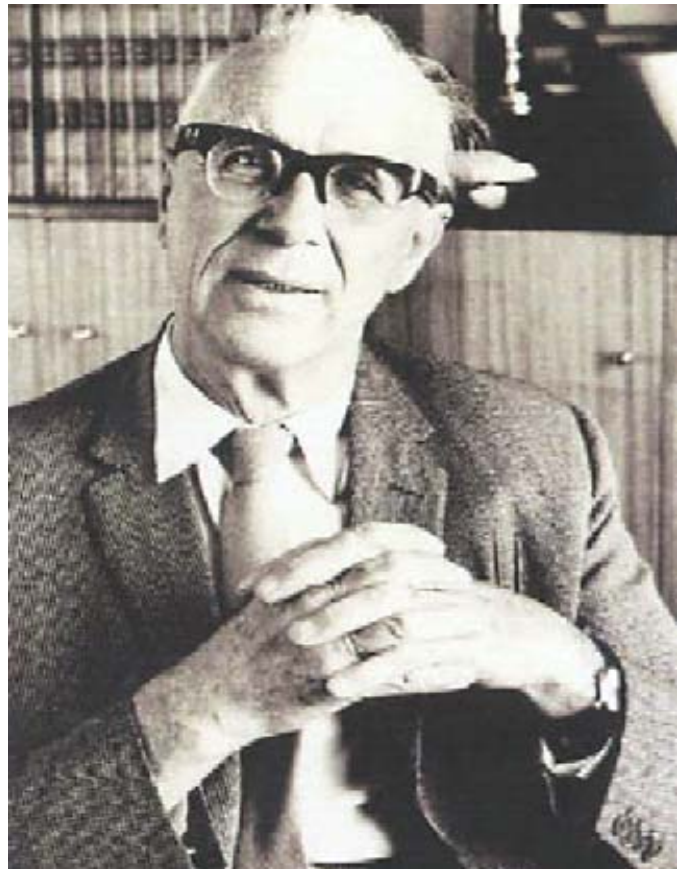
ARUP

Sir Ove Arup



Sir Ove Arup founded his practice in London in 1946 based on a belief in ‘total design’ — the integration of the design process and the interdependence of all the professions involved, the creative nature of engineering, the value of innovation and the social purpose of design.

Today we understand this as a commitment to sustainability.

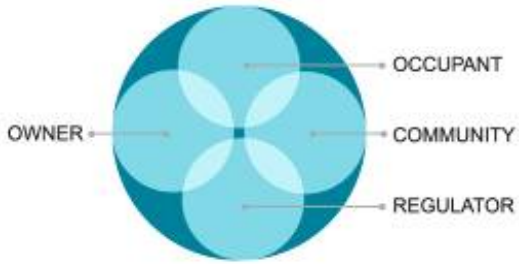


Across Industries

Education, Real Estate Development, Infrastructure, Manufacturing, Tourism, High-Tech, Financial Services, Health Care, Government and Cultural

Multiple levels of assessment

- Project Level
- Corporate
- Facility
- Processes
- Products
- Policy



Approach to Sustainability

Drivers of Change

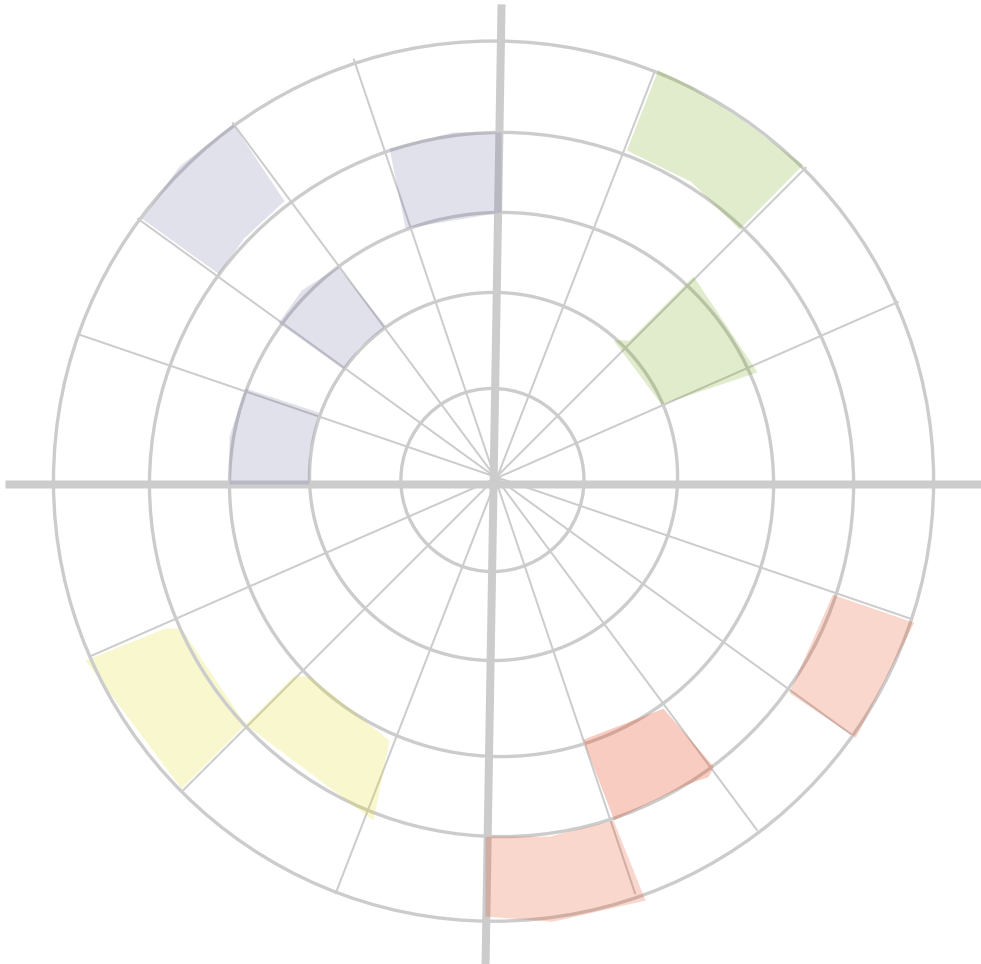
- **Resource Depletion**
  - Water
  - Energy
  - Materials
  - Biodiversity
- **Environmental Impacts**
  - Transportation
  - Waste generation
- **Climate Change**
- **Global Connectivity**
  - Alliances & Partnerships

Approach to Sustainability

Broadest lens to identify:

- **Risks**
- **Opportunities**

- **Performance Improvements**
- **Competitive Advantage**

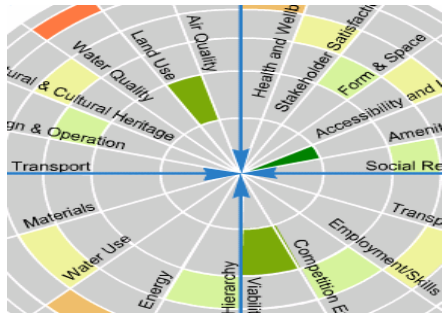


Vision Statement

VISION STATEMENT
(re-iterated from the Grounds Plan)

- **Environmental Quality: protecting and restoring our natural environment, including air and water quality**
- **Context: establishing and promoting appropriate relationships with the community and surrounding open spaces**
- **Connectivity: increasing the quality and continuity of linkages throughout the Grounds**
- **Multi-disciplinary Learning: developing mixed-use facilities to foster interaction and collaboration**
- **Preservation: continuing to enhance the University's cultural building and landscape resources**


ENVIRONMENT
Natural
Water Qu
Land Use


Air Quality
Land Use
Water Quality
Health and Well
Stakeholder Satisfac
Form & Space
Accessibility and
Amenit
ural & Cultural Heritage
gn & Operation
Transport
Social Re
Transp
Materials
Water Use
Energy
Hierarchy
Viabilit
Competition E
Employment/Skills


ent/Skills
mpetition Effects
ECONOMIC

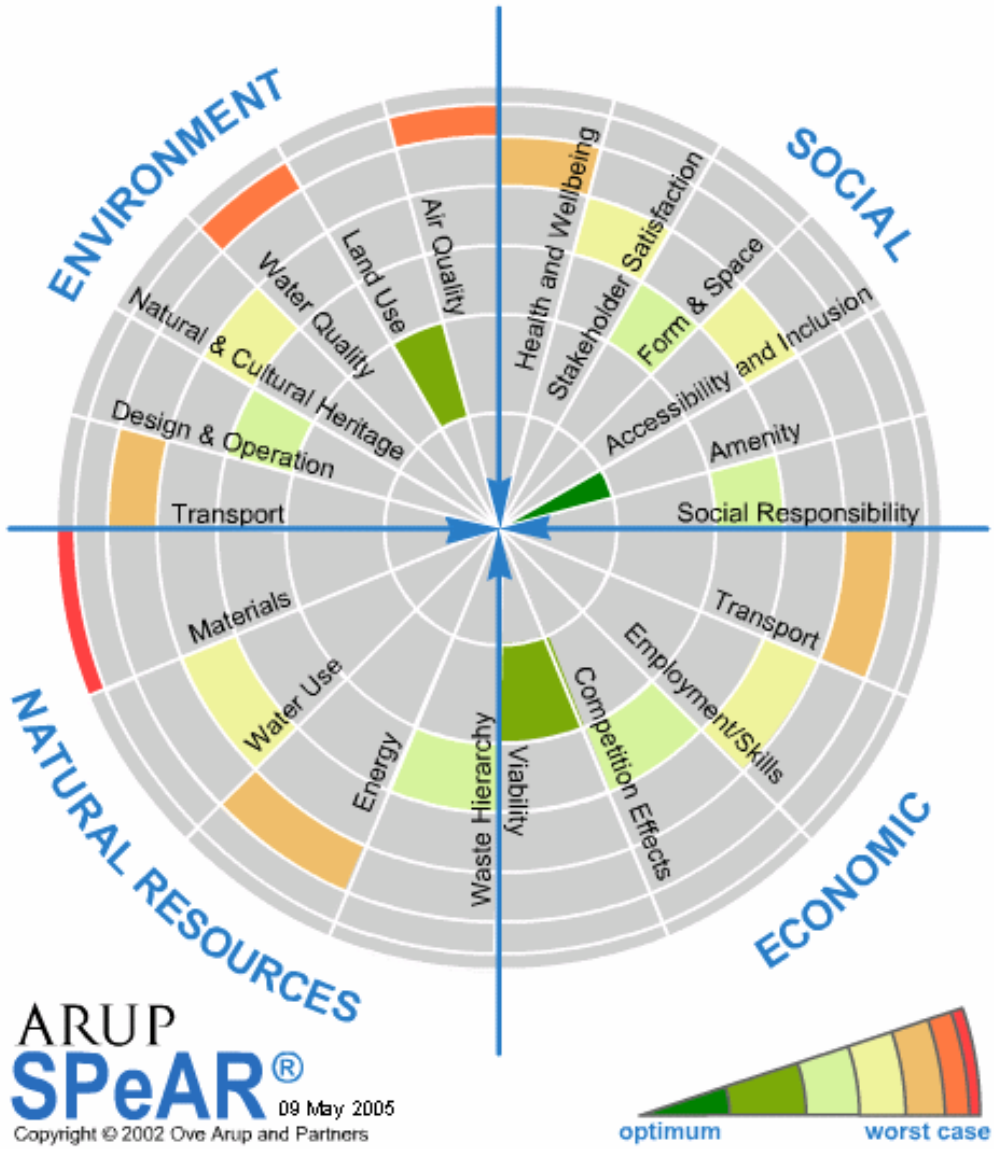
SPeAR®

The SPeAR® Tool

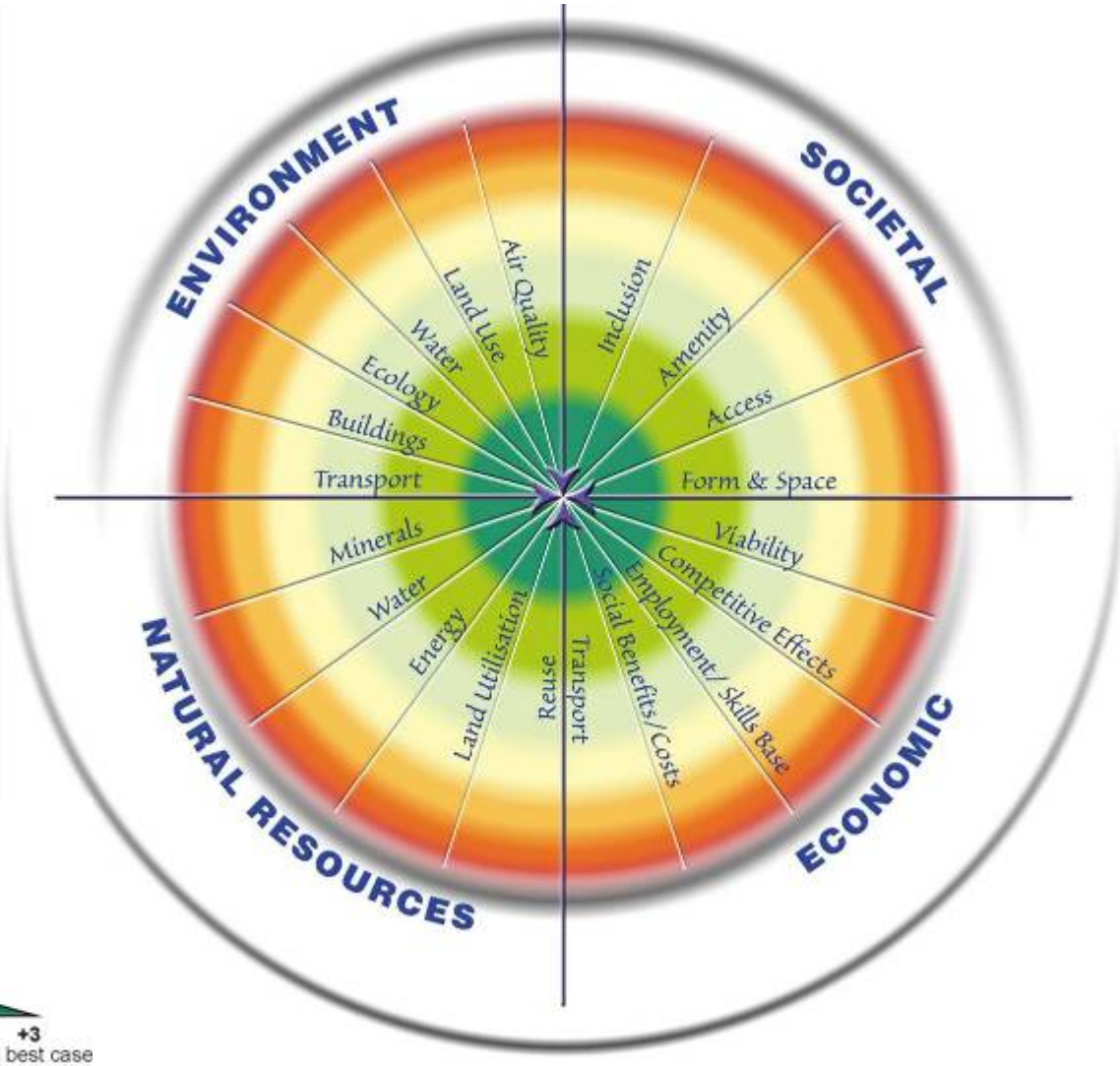
SPeAR® helps to:

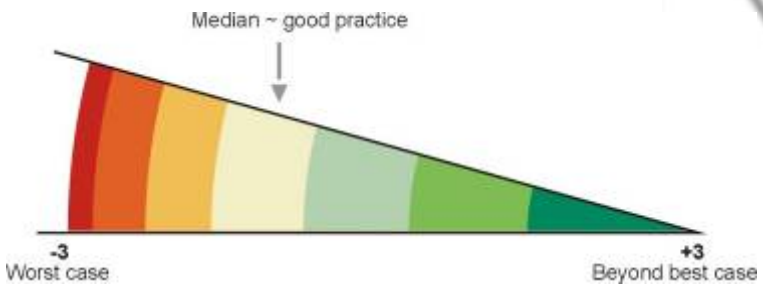
- Understand what sustainability is
- Plan for sustainable outcomes
- Design for sustainable outcomes
- Incorporate sustainability across multidisciplinary teams
- Assess sustainability performance
- Report on sustainability
- Track continuous improvement

SPeAR® – Sustainable Project Appraisal Routine



Deconstructing the SPeAR® Diagram

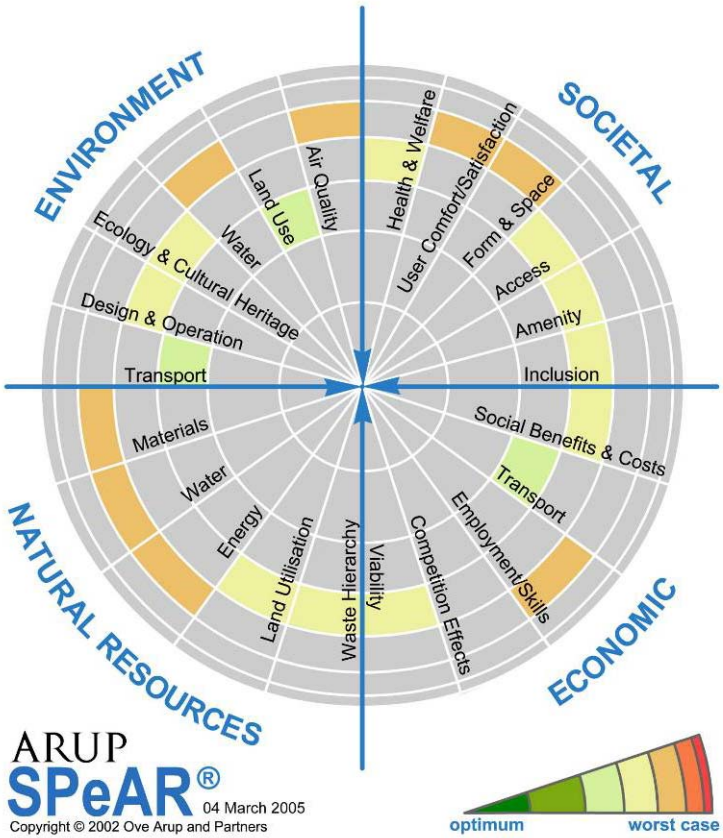




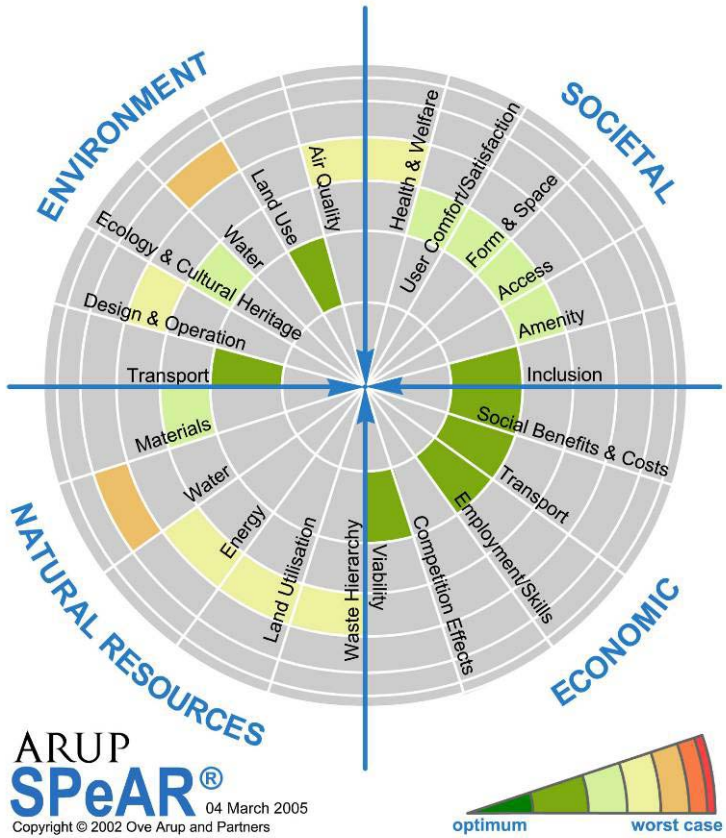
SPeAR® Interface

		The average score of "Materials"							
Water Use	**Best Case**	**Worst Case**	**3**	**2**	**1**	**0**	**-1**	**-2**	**-3**
Water Efficiency	Highly water efficient through construction and operation. Design specifically to avoid/ reduce the need for water consumption. Water efficient operations, processes or appliances to reduce consumption rates.	Low water efficiency, water intensive construction and operation. No design to avoid/ reduce water consumption. No consideration of water efficiency in operations, processes or appliances.	☐	☐	☐	☐	☐	☐	☐
Water Monitoring	Provision of method to monitor, record and target water consumption, as design intent, to drive performance improvements.	No monitoring to assess water consumption levels. No awareness of performance or the need to reduce water consumption.	☐	☐	☐	☐	☐	☐	☐
Process/ Construction Water Source	Process water or water for construction purposes is supplied from on-site renewable sources.	No consideration of process/ construction water source. 100% municipal supply, where water consumption competes with the local community's water resources e.g. leading to water shortages. Unsustainable abstraction of water that will potentially contribute to depletion of the aquifer.	☐	☐	☐	☐	☐	☐	☐
Auxiliary Water Source	Auxiliary water e.g. for watering lawns is supplied from on-site renewable sources.	No consideration of auxiliary water source. 100% municipal supply, where water consumption competes with the local community's water resources e.g. leading to water shortages. Unsustainable abstraction of water that will potentially contribute to depletion of the aquifer.	☐	☐	☐	☐	☐	☐	☐
		The average score of "Water Use"							
Energy	**Best Case**	**Worst Case**	**3**	**2**	**1**	**0**	**-1**	**-2**	**-3**
Energy Efficiency	Highly energy efficient through construction and operation. Design specifically to avoid/ reduce energy consumption. Energy efficient operations, processes or appliances to reduce consumption rates.	Low energy efficiency, energy-intensive construction and operation. No design to avoid/ reduce energy consumption. No consideration of energy efficiency in operations, processes or appliances.	☐	☐	☐	☐	☐	☐	☐
Energy Sources	All project energy needs satisfied by renewable sources. Use of residual heat from energy generation e.g. combined heat and power (CHP) and from high-energy processes.	Renewable energy not considered as an alternative energy source. Residual heat wasted.	☐	☐	☐	☐	☐	☐	☐
Energy Monitoring	Provision of method to monitor, record and target energy consumption, as design intent. Management procedures in place.	No monitoring to assess energy performance levels. No awareness of performance in terms of energy usage.	☐	☐	☐	☐	☐	☐	☐

Performance Comparison

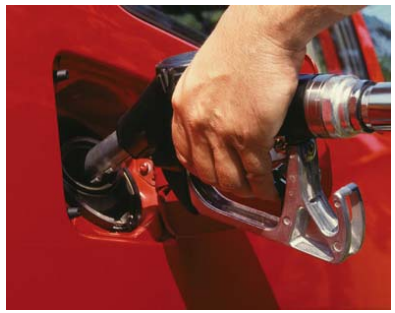


BASELINE



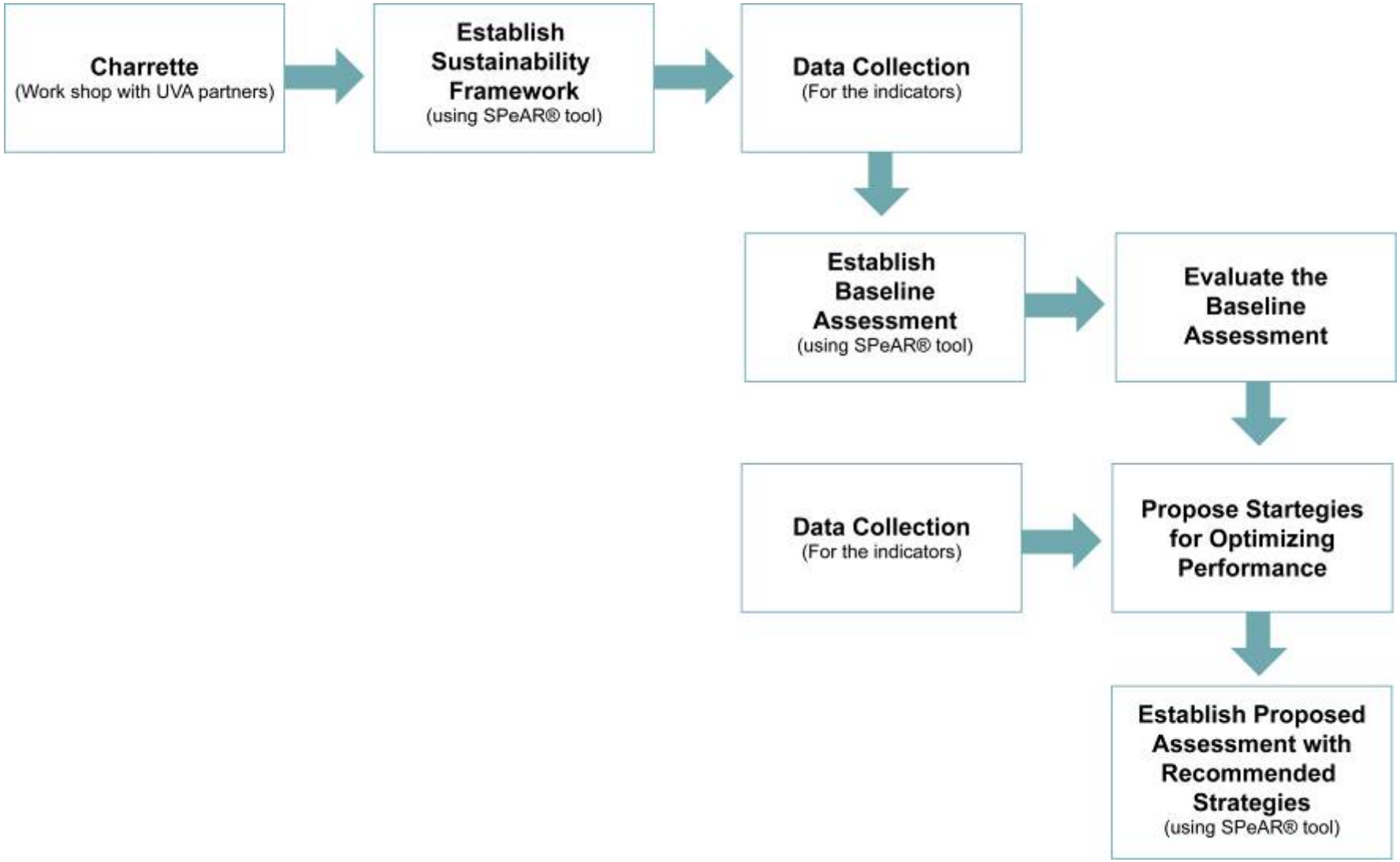
PROPOSED



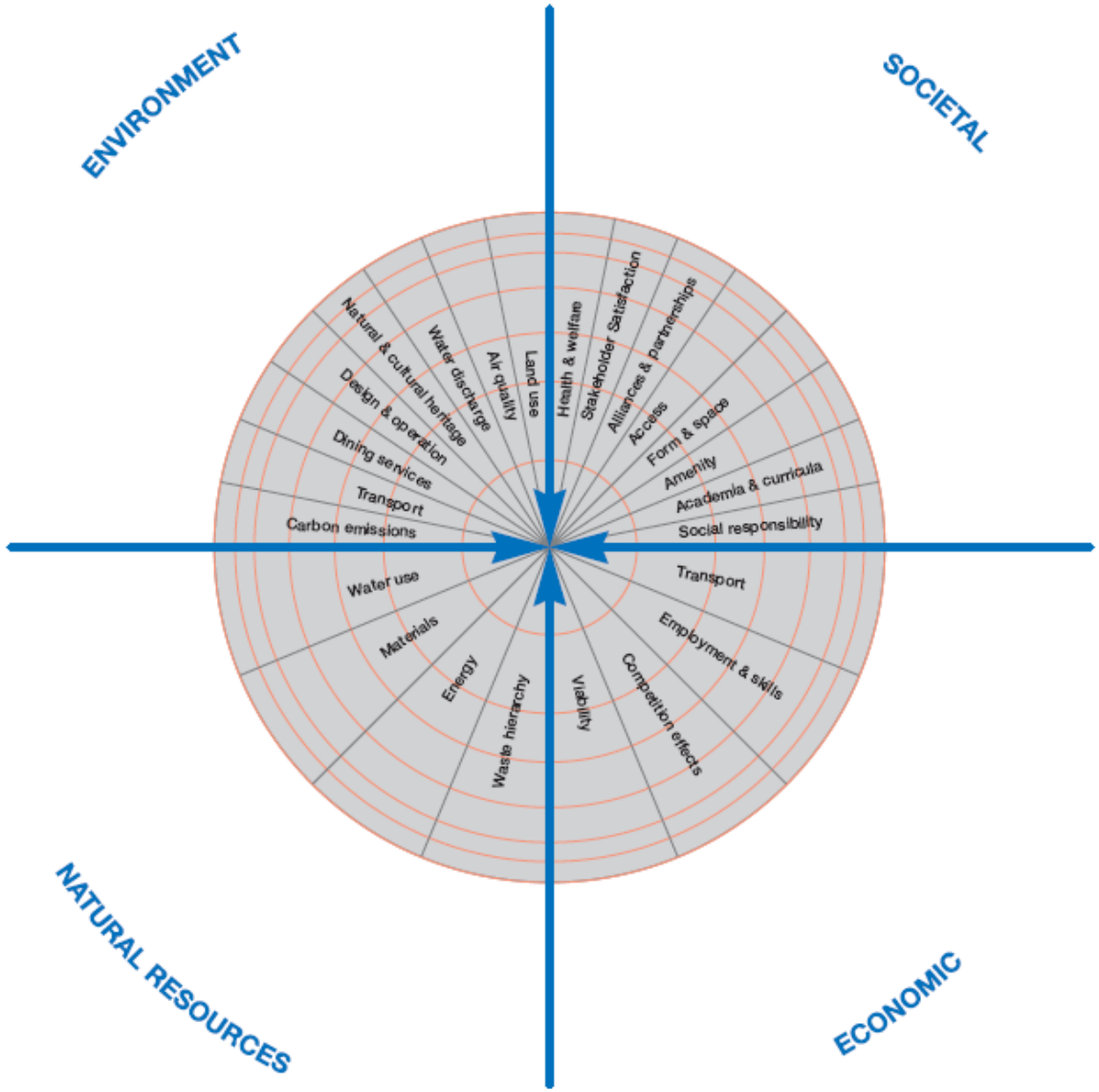



The Process

UVA Sustainability Assessment Process



UVA Sustainability Assessment – Framework Evolution (SPeAR)



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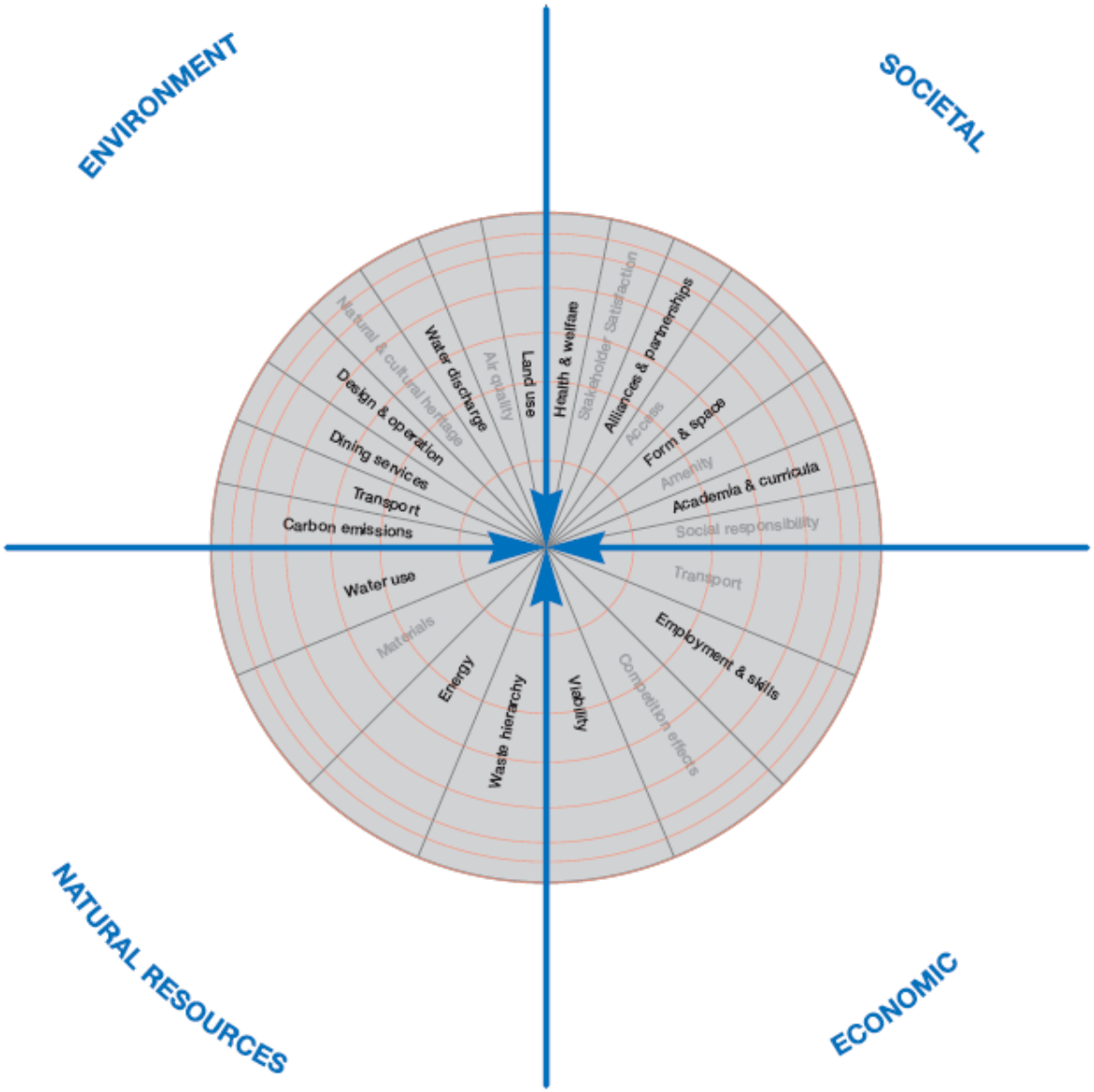
UVA Sustainability Assessment – Framework Evolution (SPeAR)

Identify Applicable/ Contextual Focus Areas



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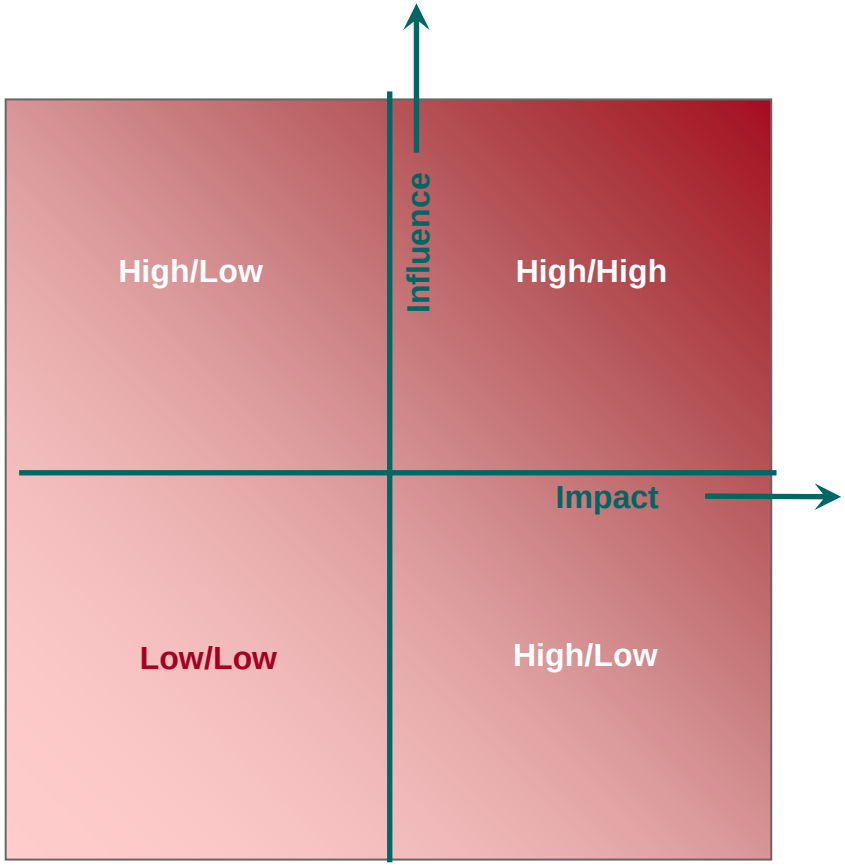
Assessing Materiality



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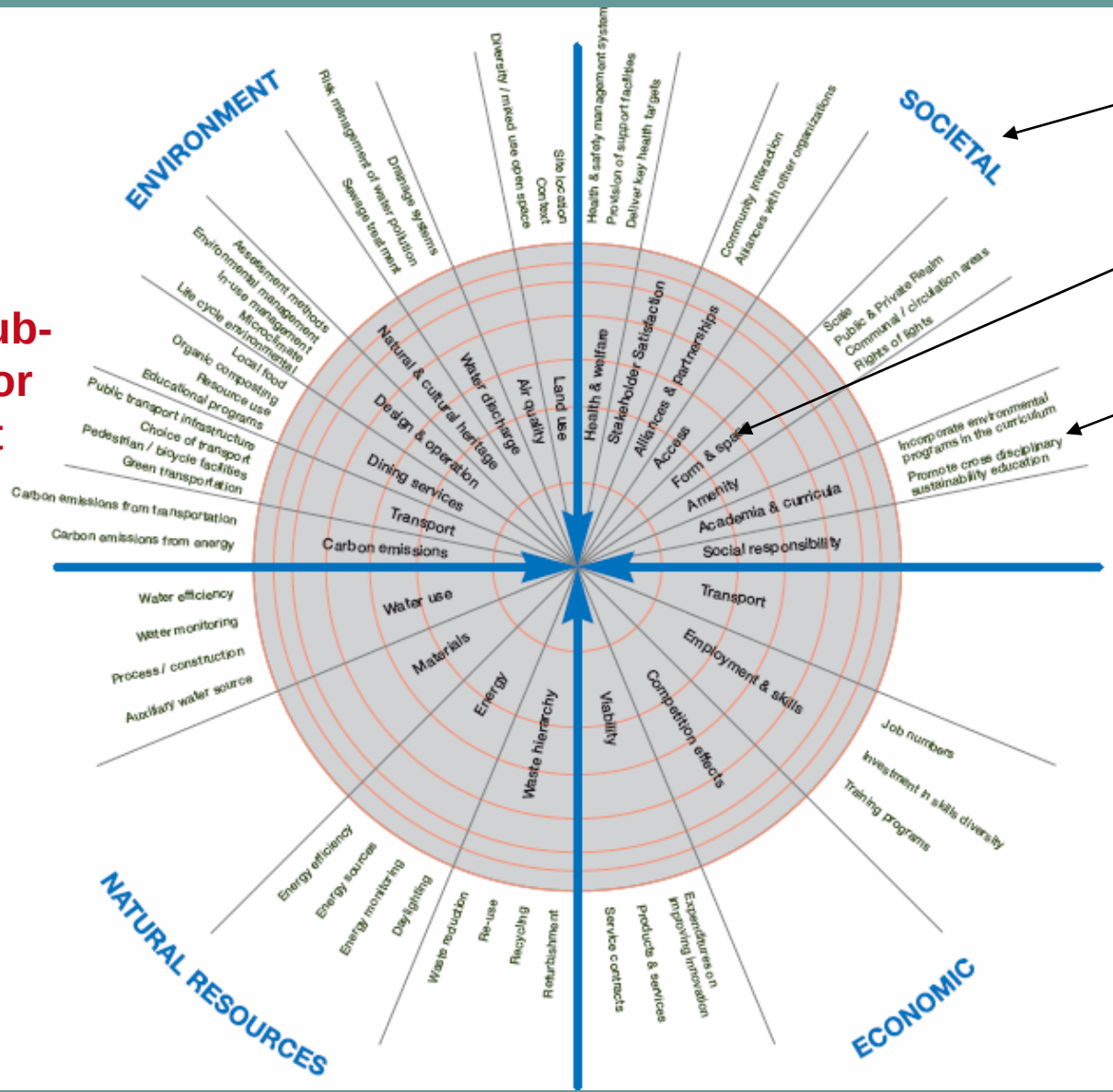
UVA Sustainability Assessment – Framework Evolution (SPeAR)

Establish sub-indicators for assessment



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UVA Sustainability Assessment – Framework

Environment

Land Use

- Site Location
- Context
- Diversity/Mixed Use
- Open Space

Water Discharge

- Drainage Systems
- Risk Management of Water Pollution
- Sewage Treatment

Design Operation

- Assessment Methods
- EMS
- Microclimate
- Life Cycle Impact Assessment

•Transport

- Public Transport Infrastructure
- Choice of Transport
- Pedestrian/Bicycle Facilities
- Green Transportation

Dining Services

- Local Food
- Organic Composting
- Resource Reuse
- Educational Programs

Carbon Emissions

- Transportation
- Stationary Systems

Natural & Cultural Heritage

- Habitat Conservation
- Biodiversity
- Cultural Heritage Resources

UVA Sustainability Assessment – Framework

Natural Resources

Water Use

- Water Efficiency
- Water Monitoring
- Process/Construction Water Source
- Auxiliary Water Source

Energy

- Energy Efficiency
- Energy Sources
- Energy Monitoring
- Daylighting

Waste Hierarchy

- Waste Reduction
- Recycling
- Refurbishment

UVA Sustainability Assessment – Framework

Economic

Employment & Skills

- Job Numbers
- Diversity
- Training Program

Viability

- Expenditure on Environmental Performance
- Innovation
- Risk Management
- Products & Services

UVA Sustainability Assessment – Framework

Societal

Health Welfare

- Provision of Support Facilities
- Deliver Key Health Targets

Form & Space

- Scale
- Public & Private Realm
- Communal/Circulation Areas
- Acoustical Comfort
- Rights of Light

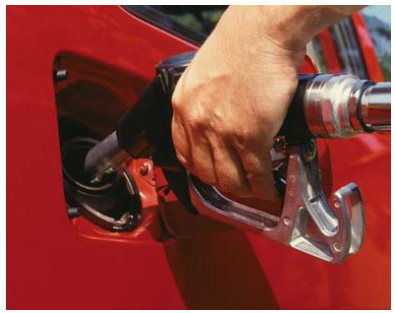
Academics & Curricula

- Incorporate Environmental Programs
- Promote Cross-disciplinary Sustainability Education

Alliances & Partnerships

- Community Interaction
- Alliances with other Organization

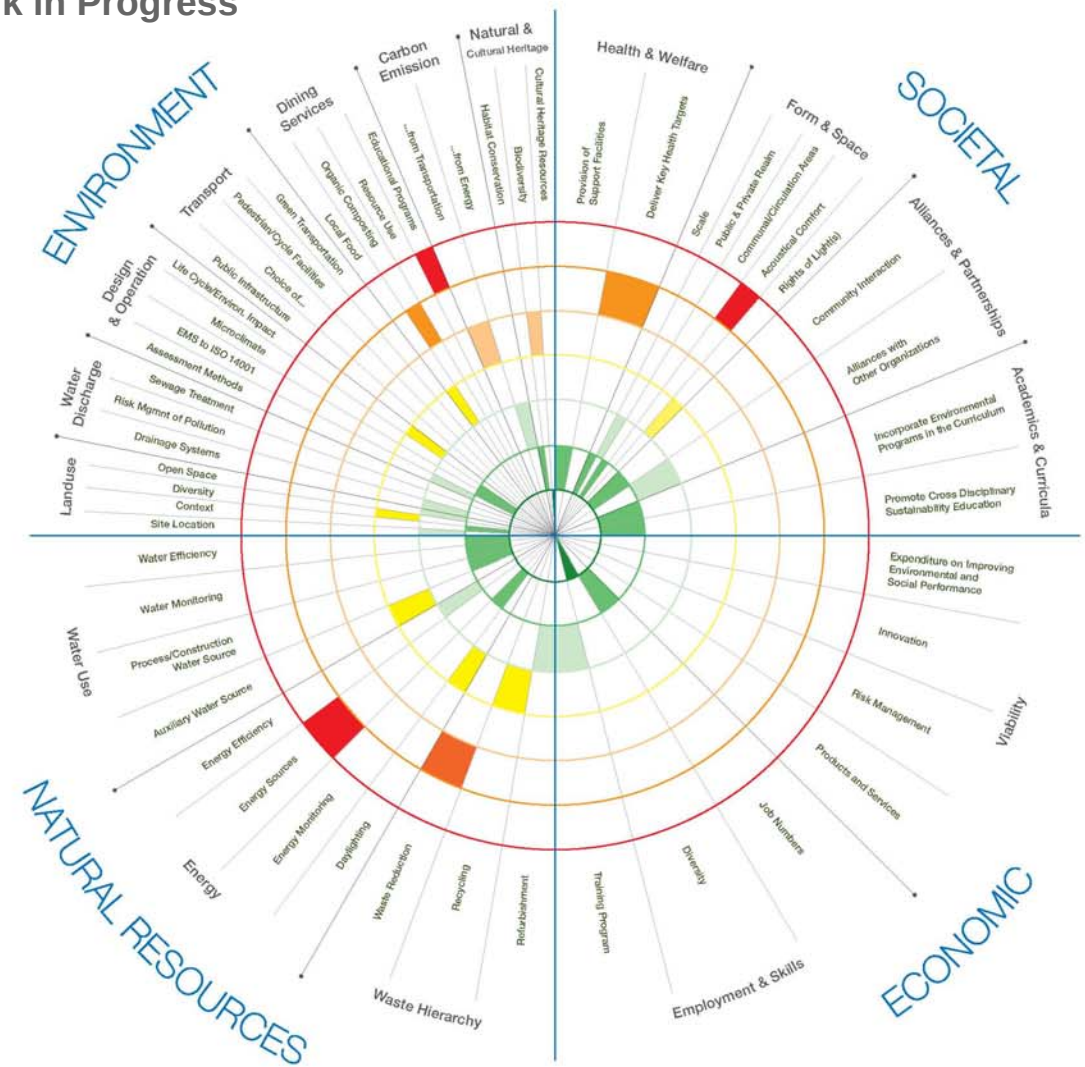





The Assessment

UVA Sustainability Assessment Baseline- By Indicators

Work in Progress



-3
-2
-1
0
1
2
3

Fields with no indicator are currently under study

For Discussion 11/14/2007

UVA Sustainability Assessment
SPeAR© Framework

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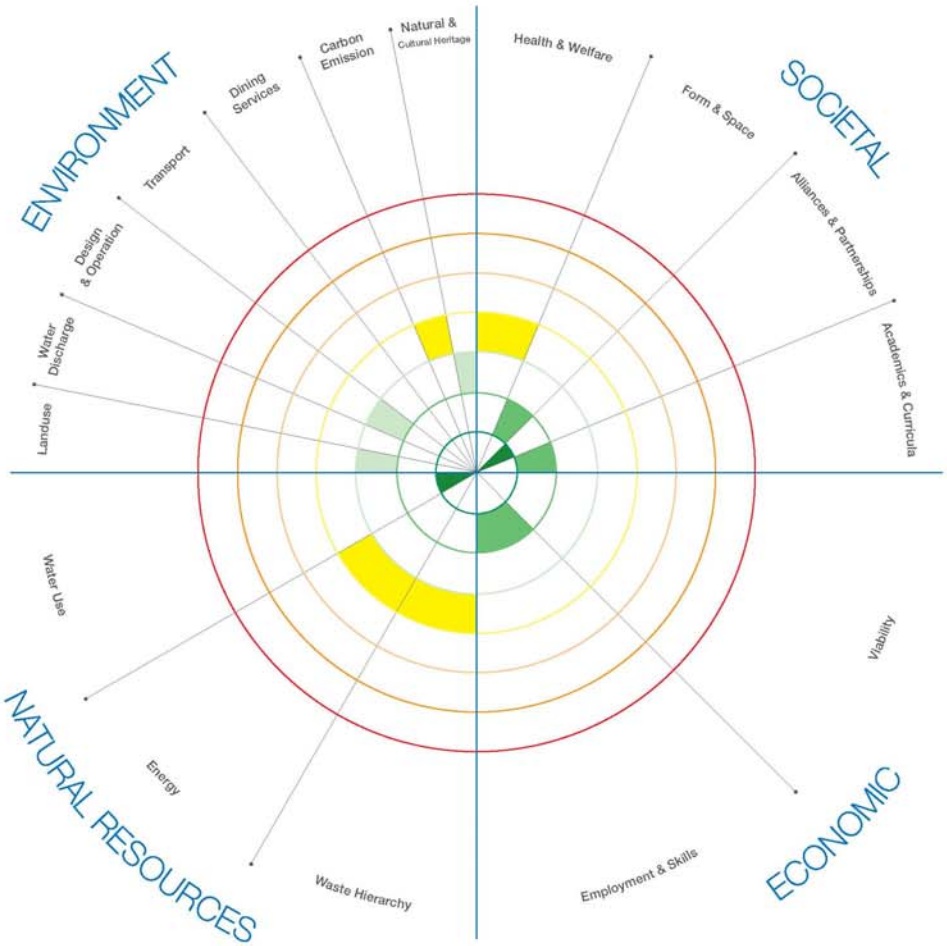
UVA Sustainability Assessment Baseline- By Focus Area

Work in Progress



-3
-2
-1
0
1
2
3

Fields with no indicator are currently under study

For Discussion 11/14/2007

UVA Sustainability Assessment
SPeAR© Framework 2

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UVA Sustainability Assessment – Strategies for Improvement

Work in Progress

Environment

Water Discharge

- Harvest rainwater

- UVA has an effective daylighting program for its buried drainage systems

Dining Services

- Increase the percentage of local food

- Establish organic composting

Carbon Emissions

- Perform a carbon footprint analysis

- Implement goals for carbon reduction

UVA Sustainability Assessment – Framework

Work in Progress

Natural Resources

Water Use

- Establish a target for potable water reduction
- Meter all new facilities for construction water use
- Meter and track data for water consumption

Energy

- Establish a energy reduction target across the campus
- Audit 3-5 buildings each year to monitor performance

Waste Hierarchy

- Evaluate on-site organic composting
- Establish a goal for waste reduction

UVA Sustainability Assessment – Framework

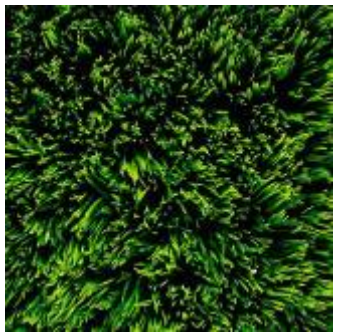
Work in Progress

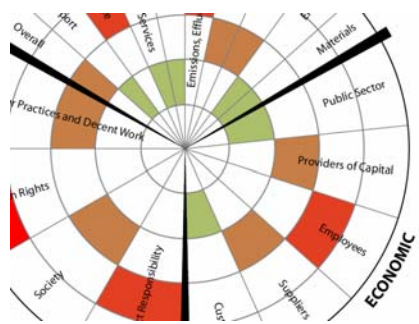
Economic

Employment & Skills

- Invest in programs for employee skill development
- Develop a centralized database for training programs
- Provide training programs for the community


+3.47
31.30
+3.28
+3.24




Materials
Public Sector
Providers of Capital
Employees
Suppliers
ECONOMIC
Society
Practices and Decent Work
Services

Examples

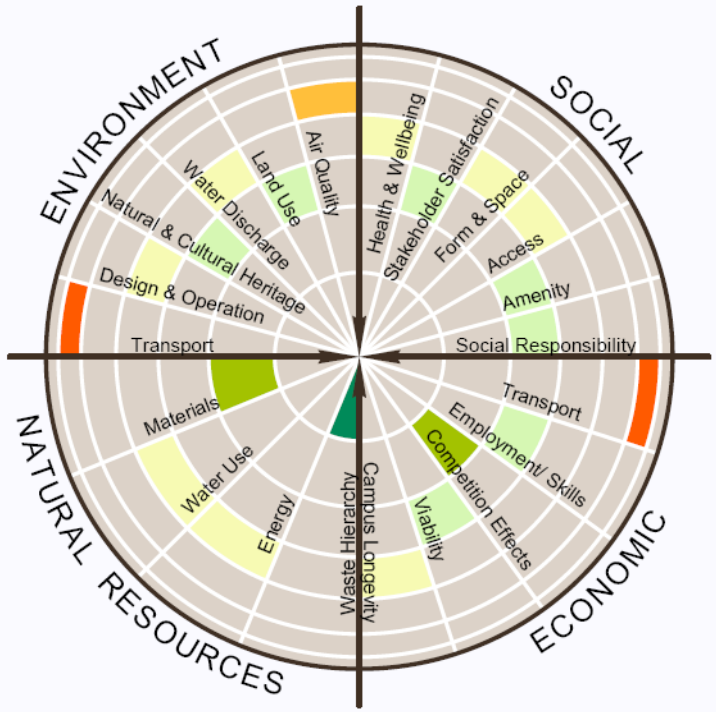
Middlebury College

Project

SPeAR® assessment of Middlebury College during Masterplan

Proposed Strategies

- Achieve carbon neutrality
  - Operational efficiency
  - Biomass boiler
  - Increased use of renewables
  - Carbon sequestration
  - Carbon offsetting
- Develop a sustainable Master Plan
- Reporting and Guidelines
  - Develop guidelines with performance benchmarks
  - Adopt “Designing the Future/Guiding Principles, Middlebury College” as a guideline for future decisions
  - Report performance against guidelines and principles through an annual report that meets global resource initiative (GRI) requirements



Baseline Assessment

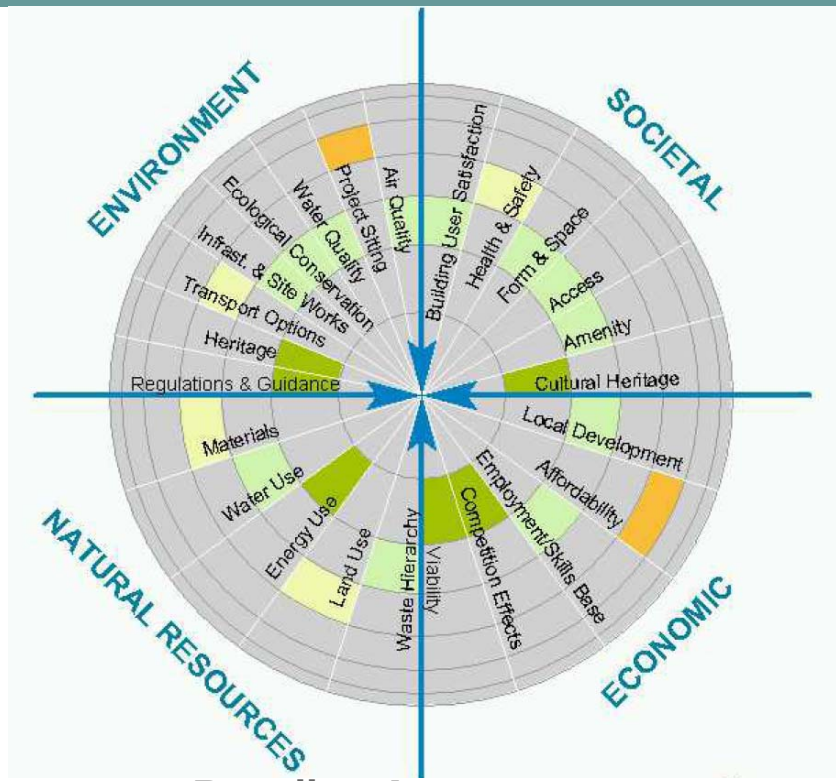
University of California Merced

Project

SPeAR ® assessment of UC Merced during construction.

Areas scored highly

- Viability
  - Meeting a market need
  - Improving business within community
- Cultural Inclusion
  - Campus will bring a diverse range of cultural and recreational facilities
  - Community interaction through student body
- Regulations and Guidance
  - Long Range Development Plan
  - LEED – NC Silver rating
- Building Energy
  - LEED – NC Silver rating – 8 to 10 credits on energy performance



Baseline Assessment

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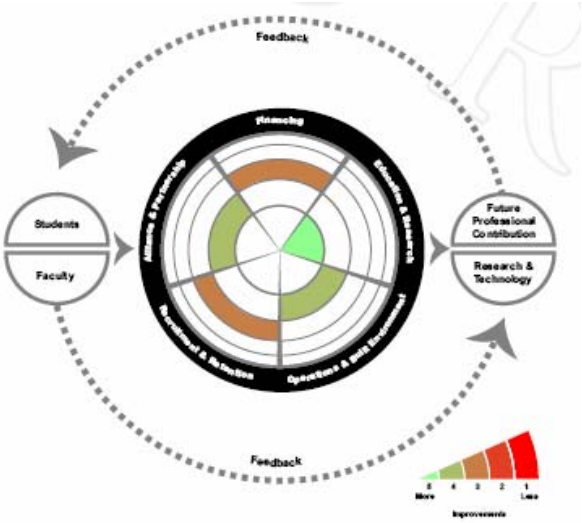
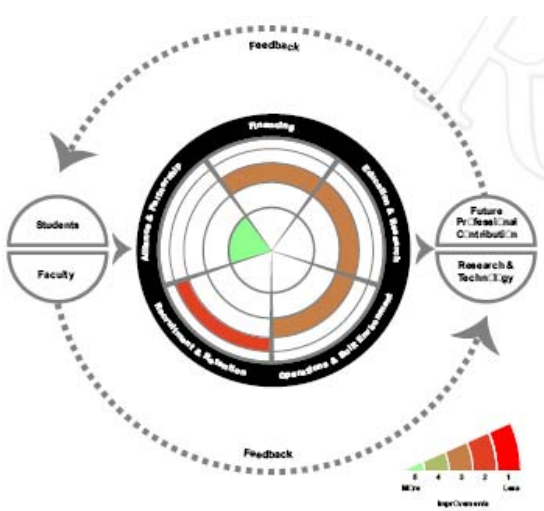
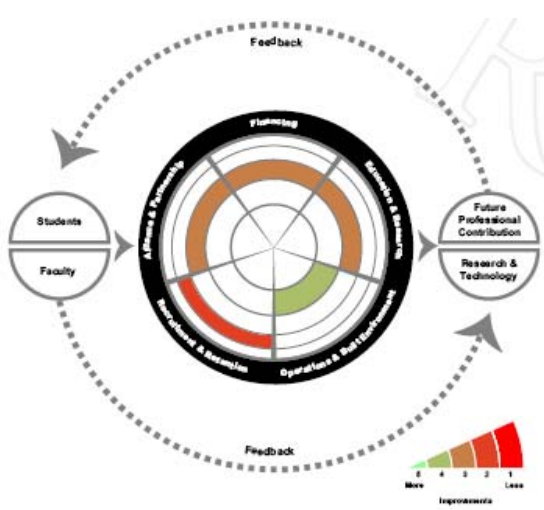
Examples- Overarching Assessment



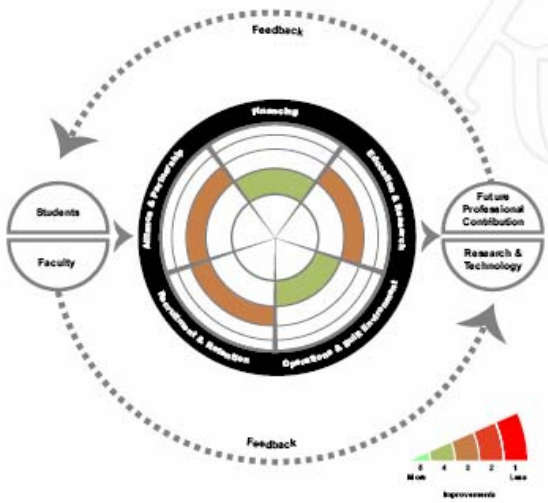
OXFORD



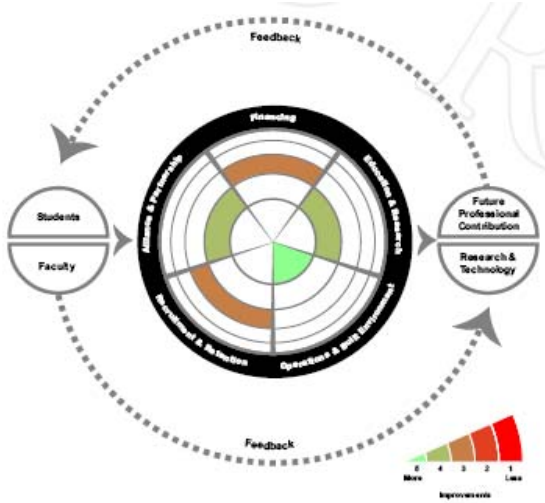
SWISS INSTITUTE OF TECHNOLOGY (ETH)



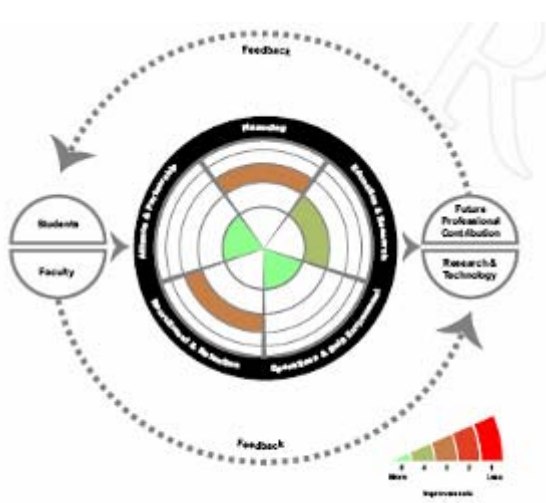
UCSB



HARVARD



STANFORD



MIT

Questions ?

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